NASA SBIR/STTR Technologies

Highly Sensitive Photon Counting Detectors for Deep Space Optical Communications

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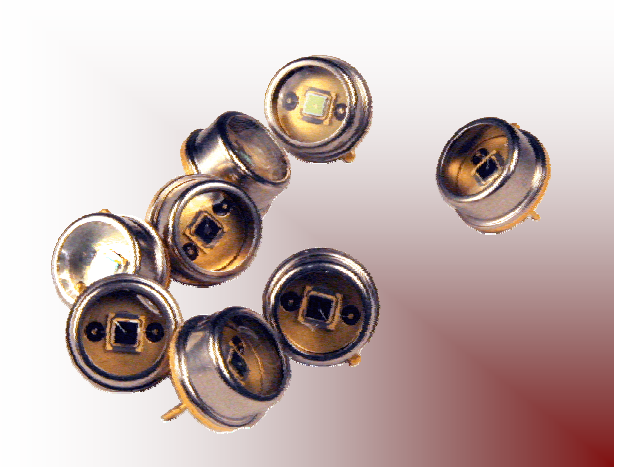
Identification and Significance of Innovation

A new type of a photon-counting photodetector is proposed to advance the state of the art in deep space optical communication. The proposed detector will operate at 1064 nm and 1550 nm wavelengths and have a GHz bandwidth, very high internal gain, and extremely low excess noise. The detector will be based on the recently invented breakthrough technology of discrete amplification. The new detector will enable meeting the NASA stated goal of boosting optical communication data transfer rates by a factor of 10-100 relative to the currently used technologies.



Technical Objectives

- Fabricate the novel photodetector modeled in Phase I
- Optimize photodetector parameters with the focus on its use in deep space optical communications

Work Plan

- Manufacture the amplification layer as modeled in Phase I
- Test amplification parameters and utilize them in the software model to optimize the design
- Manufacture the whole photodetector including the absorption layer
- Test the results, re-optimize the design and manufacturing processes, and manufacture the photodetector
- Deliver the photodetector and results to NASA

NASA Applications

- Deep space to ground communication links
- Intersatellite links
- Earth orbiting to ground optical communication
- Network formation flying spacecraft communication

Non-NASA Applications

- Fiber optical telecommunication
- LIDAR remote sensing at telecomm wavelengths
- LADAR for military applications

Firm Contacts

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